

CLAIMS

1. An automatic lathe which has a tool post and a spindle configured to relatively move in a spindle axis
5 line direction and which machines a material gripped by a spindle chuck at the tip of the spindle by use of a tool installed on the tool post, the automatic lathe characterized by comprising:

10 a head stock configured to move forward and backward;

the spindle rotatably supported on the head stock and having a through-hole formed for the rod-like material to be inserted therethrough;

15 spindle driving means which is provided in the head stock to rotate the spindle;

the tool post equipped with a tool to machine the material gripped by the spindle chuck;

a guide bush support table disposed closer to a tip side of the spindle than the head stock;

20 support table fixing means for positioning and fixing the guide bush support table at a specified position of a bed;

a guide member which is rotatably supported on the guide bush support table and which is regulated so as not
25 to move forward and backward with respect to the guide bush support table and in which a through-hole is formed to insert the spindle therein;

a guide bush detachably fitted to the tip of the guide member;

30 guide bush driving means which is provided in the

guide bush support table to rotate the guide member together with the guide bush;

5 spindle moving means for moving the spindle forward and backward together with the head stock inside the guide member;

spindle fixing means for preventing the spindle from moving forward and backward with respect to the guide bush support table, and positioning and fixing the spindle at a specified position on the guide bush support table when the guide bush is removed from the guide member; and

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control means for performing synchronous control of the spindle driving means and the guide bush driving means when machining the material by use of at least the guide bush.

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2. The automatic lathe according to claim 1, characterized in that a guide is provided to guide the forward and backward movement of the guide bush support table so that the guide bush support table is movable along the guide when the fixing of the guide bush support table by the support table fixing means is cancelled, and that when the guide bush is removed to machine the material without using the guide bush, the material gripped by the spindle chuck is machined while the head stock and the guide bush support table are being integrally moved forward and backward.

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3. The automatic lathe according to claim 1 or 2, characterized in that the support table fixing means has a positioning member positioned and fixed on the bed, and a

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bolt coupling the positioning member to the guide bush support table.

4. The automatic lathe according to claim 3,
5 characterized in that a spacer with a specified width is placed between the positioning member and the guide bush support table so that the position of the guide bush or the tip of the spindle is adjustable when the guide bush is fitted or removed.

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5. The automatic lathe according to claim 3 or 4, characterized in that the positioning member is a tool post base which supports the tool post.

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6. The automatic lathe according to any one of claims 1 to 5, characterized in that rotation transmission means for transmitting the rotation of the guide member to the spindle when the guide bush is removed is provided between the guide member and the spindle, so that the
20 rotation of the guide member is transmitted to the spindle.

7. The automatic lathe according to claim 6, characterized in that the control means controls the driving of both the spindle driving means and the guide
25 bush driving means in accordance with a cutting condition in order to use the spindle driving means and the guide bush driving means to drive the spindle when the material is machined without using the guide bush.

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8. The automatic lathe according to any one of

claims 1 to 7, characterized in that when the guide bush is removed, the spindle chuck and a cam member which opens/closes the spindle chuck are removed from the spindle and located inside the tip of the guide member, and a chuck
5 positioning member is fitted to the tip of the guide member to position the spindle chuck when the spindle chuck grips the material, thereby incorporating, in the tip of the guide member, a mechanism similar to a chuck mechanism of the spindle which grips the material during machining.

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9. The automatic lathe according to any one of claims 1 to 8, characterized in that when the guide bush is removed from the guide member, the head stock is coupled to the guide bush support table by coupling means.

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10. The automatic lathe according to claim 9, characterized in that a thermal expansion absorption member which absorbs a dimensional change of the spindle due to thermal expansion is provided in at least one place of the
20 spindle.

11. The automatic lathe according to claim 10, characterized in that the thermal expansion absorption member has regulating means for regulating the spindle so
25 that the spindle does not to move forward and backward with respect to the head stock when the guide bush is fitted, and regulation canceling means for canceling the regulation of the spindle by the regulating means.

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12. The automatic lathe according to claim 11,

characterized in that the regulating means comprises an engaging member which engages with the spindle in the front and rear on the spindle axis line, and a fitting member which fits the engaging member to the head stock so that the engaging member does not rotate with respect to the head stock and so that the engaging member has a gap of preset dimensions in the spindle axis line direction without separating from the head stock when the regulation of the spindle is cancelled by the regulation canceling means; and

the regulation canceling means is a fitting member which fits and fixes the engaging member onto the head stock.